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AUTHOR Doyle, Walter
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ABSTRACT

The interpretive review in this paper is directed toward a reformulation of teacher effectiveness questions. The analysis uses Kuhn's concept of paradigm to designate a framework which defines problems, methods, and solutions for a research community. The dominant process-pruduct paradigm in teacher effectiveness research is contrasted with two alternate approaches. A mediating process paradigm, derived from prose learning research, emphasizes the significance of student response variables as factors influencing learning outcomes. A "culture of the school" paradigm, emerging from naturalistic studies, stresses the development of student response mechanisms in reaction to the demands of the school environment. These response mechanisms appear to mediate teacher effects in part by reducing the significance of variations in teacher classroom behavior. Both alternate paradigms function as powerful tools for interpreting available data and for generating research hypotheses. (Author)

PARADIGMS IN TEACHER EFFECTIVENESS RESEARCH

by

Walter Doyle

North Texas State University

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Walter Doyle

North Texas State University

> Social theory is supposed to analyze existing societies in the light of their own functions and capabilities and to identify demonstrable tendencies (if any) which might lead beyond the existing state of affairs. By logical inference from the prevailing conditions and institutions, critical theory may also be able to determine the basic institutional changes which are the prerequisites for the transition to a higher state of development: "higher" in the sense of a more rational and equitable use of resources, minimization of destructive conflicts, and enlargement of the realm of freedom. But beyond these limits, critical theory did not venture for fear of losing its scientific character (Marcuse, 1969, p. 3).
>
> The formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old questions from a new angle, requires imagination and marks real advance in science (Einstein, as quoted in Getzels, 1974, p. 5).

Teacher effectiveness research, that is, research on relationships between teacher variables and criteria of effectiveness, has a long and formidable history within the total spectrum of empirical inquiry in education. Indeed Medley (1972) located research reported as early as 1896 which focused on the basic question of factors constituting effective teaching. Since the mid-1920's interest in teacher effectiveness has stimulated a vast amount of research activity, so that by 1950 Domas and Tiedeman were able to find over 1000 documents related to this topic. A cursory inspection of recent literature (e.g., the May, 1974 issue of the Educational Researcher; the January, 1974 issue of Phi Delta Kappan; and the Spring, 1973 issue of the Journal of Teacher Education) indicates

that answers to teacher effectiveness questions are being pursued with sustained vigor and with support from the National Institute of Education and a host of teacher education and teacher evaluation reformers.

Although the question has been asked numerous times, the answer has remained elusive. Despite the flurry of research activity, efforts to achieve a cumulative integration of research findings (e.g., Barr et al., 1961; Getzels & Jackson, 1963; Medley & Mitzel, 1959; Morsh & Wilder, 1954; Rosenshine, 1971a; Stephens, 1967) have, with remarkable regularity, failed to support the existence of stable and consistent relationships between teacher variables and effectiveness criteria. Although some cautious optimism is perhaps warranted (e.g., Flanders & Simon, 1969; Gage, 1972), past experience in this area strongly suggests that establishing stable teacher effectiveness relationships will not be easy.

There would seem to be at least two possible approaches in response to this failure to establish stable teacher effectiveness laws. The first approach is to accept the question as asked and continue the attempt to produce more consistent findings through improvements in design, measurement, and data analysis. This stance is reflected in the work of most teacher effectiveness researchers (e.g., Barr, 1929; Barr et al., 1961; Gage, 1972; Medley & Mitzel, 1963; Rosenshine & Furst, 1973). The second approach is to take another look at the teacher effectiveness question itself to see whether, in the process of formulation, significant dimensions have been overlooked. With few exceptions, notably Stephens' (1967) treatment of spontaneous tendencies in schooling, the teacher effectiveness question has not received systematic and extended scrutiny. In other words,

few have doubted, in spite of negative results, that the teacher effectiveness question can ultimately be answered.

The present paper reports a preliminary attempt to analyze the way in which the teacher effectiveness question is formulated. The approach rests on the premise that the consistency of nonsignificant findings justifies a more thorough inquiry into the question itself. The adoption of this focus is not intended to minimize the significance of methodological issues. Methodological directives by themselves do not, however, serve to resolve all scientific disputes (Kuhn, 1970, pp. 3-5 especially). Of greater importance is the set of assumptions which guide research decisions. It is these assumptions and choices which define the primary content of the present paper. Further specification of the rationale for this approach necessitates the introduction of the notion of "paradigm" which serves as the basic analytical framework for the present inquiry.

The concept of "paradigm." The term "paradigm" is derived from Kuhn's (1970) analysis of scientific revolutions and is used to designate the shared framework which defines the problems, methods, and solutions acceptable to a research community (see related discussions in Barber, 1973; Nuthall & Snook, 1973; Snow, 1973). A paradigm, in other words, designates which problems can be expected to have a solution, which methods can legitimately be used to solve these problems, and which of the available solutions is adequate. Used in this manner, the concept of paradigm is not equivalent to a theory (defined as an explanatory model or system) but can function to influence the choice of a "theory" which isolates variables compatible with the paradigm. In addition, many of the most important features of a paradigm are seldom explicitly articulated, although in

principle they can be.

In presenting the concept of paradigm, Kuhn (1970) emphasizes that a paradigm is not a set of formalized rules but rather exists in part as "tacit" knowledge, that is, knowledge acquired through direct experience rather than communicable through words (see Polanyi, 1966). This tacit dimension makes the analysis of paradigms a difficult task since there is considerable room for interpretive error. Although it is possible to point to exemplars or to cite instances which seem to have paradigm implications, the final question is one of judgment concerning the degree of emphasis reflected in a research tradition. Given this judgmental factor, two paradigm analyses may not completely agree. It follows that the present analysis must necessarily be tentative.

Within a designated research community, a paradigm functions to (a) provide a model for problem identification and solution; (b) guarantee that a stable solution exists; and (c) justify the expenditure of substantial resources by researchers and by funding agencies. Little systematic research or scientific progress is possible without a paradigm to establish a shared exemplar for practitioners. At the same time, a paradigm, by specifying legitimate problems, methods, and solutions, operates in a legislative fashion to determine the kinds of questions asked and the kinds of data considered relevant. As Gage states: "Choice of a paradigm, whether deliberate or unthinking, determines much about the research that will be done" (Gage, 1963, p. 96). A paradigm, in other words, has normative consequences which establish the parameters of legitimate thought and practice in a research domain. In view of these normative functions,

the paradigm operating in teacher effectiveness research merits careful consideration.

The use of the term "paradigm" in this context does not imply that educational research has achieved the maturity which Kuhn (1970) associates with paradigms in the natural sciences. Rather, the discussion is intended to suggest that teacher effectiveness research, as a specialization within educational research, defines a sufficiently identifiable community of researchers. In addition, these researchers possess a shared perception of adequacy which is used systematically to evaluate work emerging from and impinging upon their area. This shared perception of adequacy behaves in a manner analogous to the operation of paradigms in more mature science communities. There are enough parallels at least to suggest that an analysis of paradigms in teacher effectiveness research would be fruitful. Moreover, nonsignificant findings as well as anomalies appear with sufficient regularity to establish adequate justification for the direct value of paradigm analysis.

Overview. The present analysis focuses initially on defining the essential characteristics and assumptions of the process-product paradigm which dominates current teacher effectiveness research. This process-product paradigm is viewed as a culmination of a long tradition of research, and therefore a brief survey of the historical background for this position is provided. Subsequently, the discussion turns to a consideration of two alternate teacher effectiveness paradigms, viz., the mediating process paradigm derived from applied verbal learning research and a "culture-of-the-school" paradigm evolving from naturalistic studies

of classroom events. These paradigms represent alternate approaches to the study of instruction and are selected in part because they focus directly on variables which are either neglected or of minor significance in the process-product paradigm. The use of alternate paradigms to view the same research domain further makes explicit underlying assumptions, underscores gaps in the dominant process-product paradigm, and provides direction for reformulation of teacher effectiveness questions.

Given the scope of the present analysis, several limitations have been imposed to meet reasonable time and space requirements. First, the analysis focuses primarily on conceptual rather than methodological issues. Matters of methodology will be considered as necessary to illustrate the main conceptual points. Second, the analysis is restricted to teacher effectiveness research within the broad scope of research on teaching. No effort will be made to consider these broader research questions, except as necessary to provide a context for the present discussion. Third, the investigation is conceived as a broad sweep across several research traditions and domains. As a result many fine-grained details are necessarily overlooked and no attempt is made to review all of the related literature. Rather, a few exemplars are selected to illustrate the main thrust of the argument. Finally, in view of these limitations, the analysis is intended to be suggestive rather than exhaustive. It is hoped that a clarification of basic assumptions and choices will contribute to a greater understanding of the nature and magnitude of teacher influence in the classroom.

The Process-Product Paradigm

Within teacher effectiveness research, the process-product paradigm

represents a distinctive approach. In particular, the paradigm emphasizes research on the relationships between measures of teacher classroom behaviors (processes) and measures of student achievement (products). The frequency with which this basic viewpoint appears in recent literature on teaching and teacher education indicates that it is the dominant paradigm operating in teacher effectiveness research today.

The process-product paradigm permeates the work of several investigators and some diversity of emphasis and interpretation is apparent (see, e.g., Brophy, 1974; Flanders, 1970, 1971; Glass, 1974; Nuthall, 1970; Soar & Soar, 1972). Soar (1972), for instance, places considerably more emphasis on nonlinear relationships between teacher behavior and student achievement than do some other process-product researchers. In order to maintain consistent focus, therefore, the present analysis concentrates primarily on that version of the paradigm reflected in the works of Gage (1971, 1972) and of Rosenshine (1970b, 1970c, 1971a, 1971b; Rosenshine & Furst, 1971, 1973). Both of these researchers have been very active in advancing and refining the paradigm and most of its followers, especially in the field of teacher education, make reference to their works. Nevertheless, any conclusions here are considered applicable to the Gage-Rosenshine framework.[1]

Nature of the paradigm. Rosenshine defines the basic elements of the process-product paradigm in terms of four steps:

> (1) the development of an instrument which can be used systematically to record the frequency of certain specified teaching behaviors; (2) use of the instrument to record classroom behaviors of teachers and their pupils; (3) a ranking of the classrooms according to a measure of pupil achievement adjusted for initial difference among the classes;

> and (4) a determination of the behaviors whose frequency of occurance is related to adjusted class achievement scores (Rosenshine, 1971b, p. 53; 1971a, p. 18).

In a further elaboration of the paradigm, Rosenshine and Furst (1973) suggest a two-stage research strategy in which findings from correlational studies (the subject of Rosenshine's several reviews) become the source of variables for experimental investigations of the effects of teacher behavior on student achievement.

To date, the most promising results concerning process-product relationships have been obtained from correlational studies using rating or "high inference" measures of teacher behavior. Teacher behaviors which exhibit the qualities of clarity, variability, enthusiasm, and task or businesslike orientation would appear to have a positive relationship to adjusted class mean scores (Rosenshine and Furst, 1971). It is clear from Rosenshine's writings, however, that he favors an objective, "low inference" approach to measuring teacher behavior and an experimental research format. In contrast to the high-inference, correlational strategy, the paradigmatic research design would appear to be that used in a series of studies, in which both Gage and Rosenshine participated, focusing on teacher lecturing behaviors (see Gage et al., 1971). Low inference measures of teacher behavior enable findings to be translated directly into teacher education skill training programs and experimental research gives greater assurance of causal relationships. Gage (1971) has referred to this approach as "tool development" research and has argued strongly for its importance to the improvement of teaching (see also Rosenshine & Furst, 1973).

Ideally, then, a study, to be compatible with the basic features of

the process-product paradigm, must contain information concerning the relationship of teacher behavior measures (preferably low-inference) to gains in student learning outcomes. Operationally, the paradigm focuses on isolating statistical associations between the frequency of specific teacher behaviors and changes in class mean scores. The fundamental operating assumption of the paradigm is that it will ultimately be possible to discover a set of behaviors which have a stable and consistent causal effect on student learning outcomes. These basic components and their relationship are illustrated in Figure 1 below.

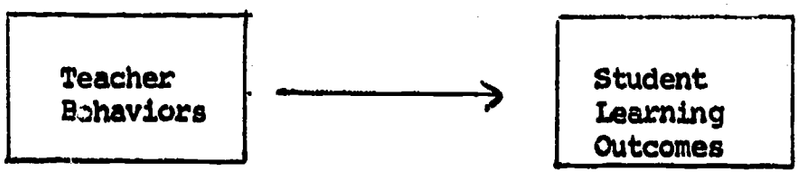

Figure 1: Components of the Process-Product Paradigm

Basic assumptions. Existing research which qualifies for consideration under the process-product paradigm would appear to support the existence of relationships between teacher behavior and student outcomes and has led some researchers to be optimistic (Flanders & Simon, 1969; Gage, 1972). Rosenshine strongly emphasizes, however, that the relationships he has been able to describe are not sufficiently stable and consistent to be considered verified process-product laws. Rather, he merely suggests that the available data supports further research on these variables (e.g., clarity, variability, enthusiasm, etc.). An assessment of the productivity of the paradigm at the present time must necessarily

conclude that process-product laws do not currently exist (see Heath & Nielson, 1974). The fact that few of the high-inference, correlational relationships have survived experimental treatment (see Rosenshine & Furst, 1973, p. 61 especially) gives additional support to this evaluation of the paradigm's productivity.

Given a strong orientation toward optimism and further research (attitudes which have characterized teacher effectiveness research from the very beginning), Rosenshine devotes considerable attention to the formulation of methodological directives to increase the productivity of the paradigm (see, especially, Rosenshine & Furst, 1973). These methodological directives have, in turn, been the target of several recent critiques (e.g., Flanders, 1973; Heath & Nielson, 1974) concerning such matters as operational definitions of variables and basic research design. Since the present analysis focuses on conceptual dimensions of teacher effectiveness research, it will not be possible to consider in detail these methodological controversies. In order, however, to delineate more fully the nature of the process-product paradigm, it is necessary to discuss briefly several of the assumptions associated with the approach. Assumptions concerning stability, generalizability, frequency, and direction of causality are fundamental to the paradigm and have been discussed to some degree in the existing literature. Additional assumptions concerning the primacy of learning, the centrality of teacher actions, and the role of explanatory models have received less attention and will therefore be considered in greater detail in the present context.

In order to conduct process-product research it is necessary to assume

that teacher effects on student achievement are stable across time and generalizable across settings (defined to include the age of students, subject matter, class size, type of learning outcomes, etc.). The question of stability has received direct attention from Rosenshine (1970c) and has become a major focus in Brophy's (1974) work. At the present time there is little evidence to support the stability assumption. The question of generalizability has received less attention and also shares the lack of supporting evidence. Rosenshine (1971a) and Gage (1964) have, however, stressed the importance of contextual variables in teaching research.

The process-product paradigm also contains two assumptions which are closely related to the preferred technique for measuring teacher behavior, viz., low inference category observation systems. The first of these is that frequency (amount) of teacher behavior is of greater significance than other dimensions of teacher behavior, such as timing. Research on the use of contingency management techniques in the classroom suggests, however, that timing is central in determining the effects of an intervention (see, e.g., Resnick, 1971). The second measurement-related assumption of the paradigm concerns the direction of causality in teacher-student classroom relationships. Most systematic observation and teacher effectiveness research operates as if observed teacher behaviors have a causal impact on student behaviors (see, e.g., Soar & Soar, 1972). Mitchell (1969) notes, however, that this direction of causality assumption is not warranted by the available data. Indeed, several studies have lent support to the opposite contention: that student behavior is a cause of teacher behavior (see Haller, 1967; Klein, 1971; Sherman & Cormier, 1974). This assumption is particularly

problematic in view of the correlational nature of most teacher effectiveness research. It may well be that a teacher finds it easier to be enthusiastic with a group of high achieving students.

Although the validity of the above assumptions concerning stability, generalizability, frequency, and direction of causality remain untested, they are common topics of analysis in the teacher effectiveness literature. There are, however, two additional assumptions which designate fundamental propositions in teacher effectiveness research and which have received considerably less attention by specialists in the field. These assumptions focus on the significance of explanatory models and the centrality of the teacher. In the context of the present analysis, these two assumptions are of central importance.

Much of the process-product literature contains the implicit assumption that the formulation of explanatory models is not a high-priority activity. Evidence for this assumption is contained in the fact that few attempts have ever been made to construct such explanatory models. This neglect of explanatory models would seem to be characteristic of teacher effectiveness research in general (see Guba & Getzels, 1955; Getzels & Jackson, 1960). As a result it is difficult to integrate and interpret discrete and often contradictory findings, to recognize and account for the full complexity of the phenomena under study, and to select potentially fruitful variables for further investigation (on the value of explanatory models, see Suppes, 1974). In lieu of such models, the field tends to rely on methodological directives and on box score results of previous research (Rosenshine, 1971a; Rosenshine & Furst, 1973).

In addition to the neglect of explanatory models, the process-product paradigm also shares with the teacher effectiveness field in general a commitment to the primacy and central causal import of teacher variables. In Barr's words: "Everything considered, it would seem difficult to overstate the case for the importance of the teacher" (Barr, 1939, p. 641). This concentration on teacher primacy has two major results. First, researchers tend to focus on discrete classroom events with little attention to antecedent or subsequent meetings or to other instruction resources (such as library books, films, etc.) which may have an impact (see McClellan, 1971). There are, for example, few attempts to integrate curriculum effectiveness studies, except as they contain direct teacher behavior data, into teacher effectiveness formulations. Moreover, there are few studies of the comparative magnitude of teacher effects (e.g., Anderson & Kaplan, 1974).

The assumption of teacher primacy also leads to a neglect of student classroom behaviors in formulating propositions concerning the relationship between teacher behavior and student learning outcomes. Within the process-product paradigm the most important student variable is, by definition, performance on a post-treatment achievement test. This focus on the significance of posttest achievement scores is in sharp contrast to what appears to be the working attitude of teachers, viz., a concern for immediate student reactions and behaviors (Jackson & Belford, 1965). This focus on student learning outcomes also makes process-process studies (i.e., research on relationships between teacher behavior and student behavior in the classroom) such as those of Kounin (1970) and of Gallagher (1970a, 1970b) of only secondary importance to the construction of teacher effectiveness

laws.

The above comments are not intended to suggest that the teacher is not a legitimate target for inquiry. Indeed, research on teaching by definition must include teacher variables (Gage, 1963, 1972). Furthermore, there is no intention to imply that process-product researchers totally ignore either explanatory models or student process variables. Indeed Rosenshine (1970a) does employ student process variables (attention) in an effort to explain the effects of teacher enthusiasm on student learning outcomes. The point, however, is one of emphasis. The process-product paradigm simply tends to de-emphasize explanatory models in favor of methodological directives and student process variables in favor of teacher behavior variables. These two dimensions would appear to be interrelated. As Snow notes, "the traditional emphasis on systematic factorial design has, perhaps unwittingly, fostered concentration on the boundaries of an experiment to the neglect of events occurring within the cells between pretest and posttest" (Snow, 1974, p. 279). In addition, it is important to point out that the primacy of teacher variables as factors influencing student achievement is simply an assumption. As will be noted later in the present discussion, this assumption might ultimately prove to be costly in terms of a more complete understanding of correlates of student achievement. (For other arguments concerning the importance of student process variables in research on teaching, see Bloom, 1963; Nuthall, 1970; Snow, 1974; and Tiedeman & Cogan, 1958.)

Historical background. The tendency to neglect explanatory models and student process variables would appear to have originas in the history

of teacher effectiveness research. It is obviously not possible to review the history of this research in any detail (for summaries see Davis, 1964; Medley, 1972; Snow, 1973, pp. 97-98). It is possible to note, however, that the teacher effectiveness field has experienced some minor shifts in paradigm. These shifts have occurred primarily with regard to the measurement of teacher variables (from teacher characteristics to teacher behaviors) and in the choice of criteria (from administrator's ratings to achievement test scores). In spite of these shifts, however, the field as a whole has retained a commitment to a two-factor "criterion-of-effectiveness" model relating teacher behavior to criterion variables (Gage, 1963).

In discussing teacher effectiveness designs, Gage (1963) notes that "The reader familiar with personnel selection research will recognize the criterion-of-effectiveness paradigm as indigenous to that field" (p. 115; emphasis added). This characterization of teacher effectiveness studies as personnel research would seem to be the key to understanding the basic motivation which led to the formulation of the question in the first place. The teacher effectiveness question has, from the very beginning, been a practitioner's question, a question closely associated with matters of selecting "good" teachers, dismissing "poor" teachers, improving teacher preparation, and upgrading the "efficiency" of schooling (see, e.g., Barr, 1926, 1929; Bobbitt, 1913; Boyce, 1915; Elliott, 1914). The current link between performance-based teacher education and the process-product paradigm is simply a continuation of a long tradition. Indeed, the persistence of the belief in the answerability of the question, in the face of discouraging results, would seem to be linked to the persistence of the personnel selection and evaluation problem faced by school administrators.

Of major importance in the present context, however, is the impact of the personnel orientation on the formulation of the teacher effectiveness question. If one is faced regularly with the immediate practical problem of hiring and evaluating teachers, one is inclined to assume that there is some observable teacher quality or characteristic or identifiable set of behaviors which are more salient than other variables possibly operating in the situation. In other words, if a person is charged with the responsibility of finding and keeping "good" teachers, he is forced to accept the premise that "good" teachers are identifiable in terms of a set of observable qualities or traits.

In addition to directing attention to teacher variables, the practical origins of the teacher effectiveness question would seem to foster impatience with explanatory models. The practitioner is more interested in knowing which criteria differentiate "good" from "poor" teachers; it is of little additional utility, in an immediate sense, to know why (on this point, see Clifford, 1973). This attitude is especially evident in the minority report submitted by Coxe (1952) in reaction to the first report of the AERA Committee on the Criteria of Teacher Effectiveness.

In summary, it appears that the process-product paradigm is essentially a culmination of a long tradition of teacher effectiveness inquiry. As such it shares many of the inherent characteristics of the question itself, a question which has origins in the immediate practical concerns of administrators and teacher educators. Teacher effectiveness investigations, in other words, conform to Freeman's dictum that "Educational research must start from, and return to, the practical problem" (Freeman, 1973, p. 76). This focus on

practicality leads, with compelling logic, to the formulation of teacher effectiveness questions almost exclusively in terms of teacher variables and to a general lack of interest in explanatory systems.

Student Mediating Process Paradigm

Given the tendency of the dominant process-product paradigm to de-emphasize explanatory models and student process variables, it would seem profitable to re-analyze the paradigm with frameworks which focus directly on these two dimensions. For present purposes, the first such framework selected is the mediating process paradigm derived from the works of Rohwer (1971, 1972, 1973), Anderson (1970, 1972), Rothkopf (1965, 1970), and Glaser (1966, 1972). The plan of the discussion will be first to delineate the essential features of the paradigm and second to apply the paradigm to the kinds of questions and data of concern to teacher effectiveness researchers.

Mediating processes in instruction. The mediating process paradigm is consistent with a long tradition of interest by experimental psychologists in the operation of student response variables in instruction (e.g., Lumsdaine, 1961, 1963). In the past this interest in student responses has tended to concentrate on successive approximations of the terminal performance. The distinctive contribution of mediating process researchers is the conceptualization and investigation of "mathemagenic" behaviors, that is, responses used by the learner during the learning process itself and which presumably "give birth to learning" (Rothkopf, 1965). These mediating responses encompass a number of human information processing operations, but the phenomenon is perhaps best illustrated by Rohwer's (1972, 1973) research on elaboration. Rohwer reviews evidence which

suggests that the mastery of noun-pair lists (e.g., bat-cup, chain-bowl, etc.) depends upon the extent to which the student elaborates the items during the acquisition process. Elaboration here refers to the formation of some connection between the two items (e.g., The bat is in the cup). Similar results are reported by Anderson and Kulhavy (1972) concerning the effect of "imaging" (the formation of mental images during reading) on the acquisition of content from a prose passage. Rohwer further presents data which indicates that the elaboration effect is not dependent upon such traditional discriminators as IQ, SES, or age. If elaboration occurs, mastery is achieved. Learners do differ, however, on the magnitude of the prompt required to activate elaboration, with younger learners requiring more explicit prompt conditions. A three-year-old learner, for instance, requires maximal prompt conditions (an actual demonstration of the bat going into the cup) whereas an eighteen-year-old learner needs only a minimal prompt (instructions to learn the list) in order to activate elaboration.

Although these results appear to be limited primarily to noun-pair material, their basic importance in the present context is the paradigm which they illustrate. Rohwer's "decisive research" approach to instruction employs a three-factor model of relevant variables, as illustrated in Figure 2 below.

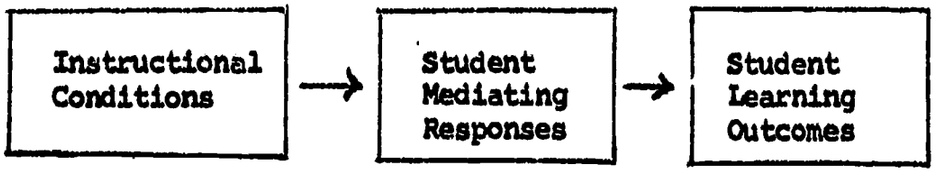

Figure 2: Variables in the Student Mediating Process Paradigm

According to this paradigm, variations in student learning outcomes are a function of the mediating processes employed by the student during the learning process itself. In turn, the mediating processes which the student uses would seem to be influenced in part at least by instructional conditions, which would include teacher behaviors. In this framework, teacher behavior is not as directly related to student learning outcomes as suggested in the dominant process-product paradigm, but rather are mediated by the learning mechanisms employed by the student during the learning process.

Before going on to a consideration of teacher effectiveness from this perspective, it is necessary to clarify briefly the relationships among variables posited in Figure 2. Although the relationship between student mediating processes and student learning outcomes is generally considered to be relatively direct, most researchers in this tradition tend to view the connection betwen instructional conditions and student mediating processes in less direct terms. Rothkopf (1965), for example, distinguishes between nominal and effective stimuli in instruction: stimulus characteristics of an instructional treatment (nominal stimuli) are not necessarily the ones to which the student attends (effective stimuli). This distinction suggests that teaching strategies that differ in a number of surface characteristics may, from the student's perspective, offer nearly identical experiences (see Bloom, 1963).

Application to teacher effectiveness research. The utility of the student mediating process paradigm depends upon its contribution to a greater understanding of teacher effectiveness questions. It is necessary,

therefore, to apply the paradigm to the kinds of problems and issues typically associated with teacher effectiveness research. Such a procedure should also serve to define more fully the power and scope of the process-product paradigm.

The mediating process paradigm would seem to have considerable explanatory power when applied to the interpretation of existing data in the teacher effectiveness field. This explanatory power is clearly evident in the mediating process interpretations employed by Carroll (1971) and by Glaser (1971) in commenting on the teacher lecturing studies in which both Gage and Rosenshine participated (Gage et al., 1971). In these studies, teacher variables such as clarity of presentation, gestures and movements, and the use of explanatory links were associated with the more effective presentations. There are obviously a number of parallels between these variables and the four most "promising" variables (viz., clarity, variability, enthusiasm, and task-oriented and/or businesslike behavior) emerging from Rosenshine and Furst's (1971) review of process-product studies. In reacting to the teacher explanation findings, both Carroll and Glaser focus on the fact that the amount of student attention during the lectures was significantly associated with student learning outcomes. Glaser in particular extends this student attention hypothesis as it relates to the teacher behavior variables. He suggests that clarity functions to signal the student that the teacher knows what he is doing and hence it is important to pay attention. Gestures and movements serve to arouse and sustain student attention. Finally, explanatory links provide organizational cues which would facilitate student information processing.

It is important to note that the student attention hypothesis has not been totally ignored by advocates of the process-product paradigm. Rosenshine (1970a), for instance, invokes student attention as a variable which may explain the effects of teacher enthusiasm on student learning outcomes. Similarly in his review of process-product research, Rosenshine (1971a) makes passing reference to student response variables possibly operating in teaching, and he makes occasional reference to the mediating process literature (e.g., Anderson, Faust, Roderick, Cunningham, & Andre, 1969). These references are made, however, primarily in the context of noting the differences between laboratory-based and process-product approaches to the study of teaching (see Rosenshine & Furst, 1971, pp. 56-57).

As mentioned earlier, the issue concerning the status of student response variables in the process-product paradigm is primarily one of emphasis. Student response variables simply play a minor role in process-product designs, in contrast to their central function in the mediating process literature. Although occasional reference is made to student variables, process-product researchers have seldom exploited fully the contribution of this framework for interpreting results or designing research. Aside from student learning outcomes, process-product researchers incorprate student variables primarily in the recommendation for more analysis of attribute-treatment interactions. In the ATI context, however, greater emphasis is placed on student characteristics than on student process variables during the learning process (see Berliner & Cahen, 1973).

The attitude of process-product researchers toward student response variables can be illustrated by the following two examples. The first

example is taken from Gage's (1964) description of research on teaching from the perspective of the "cognitive restructuring paradigm." The description focuses primarily on the activities of the teacher in structuring, arranging, and presenting the material to the student. The student's task appears to be to receive instruction.

> The teacher manipulates the cognitive field in accordance with laws of cognition---analogous to the laws of perception governing the constancies, groupings, and whole-qualities in visual and auditory stimuli. Then the pupil apprehends the cognitive structure to be learned. He can no more avoid learning in this instance than he can avoid seeing the phi-phenomenon (the appearance of motion when two lights are flashed in brief succession) under proper conditions (Gage, 1964, p. 278; emphasis added).

It would seem from this description that the student is a relatively passive agent in the instructional setting and that teacher actions are sufficient conditions for determining learning outcomes.

A second example of the significance of student response variables in teaching is available in Rosenshine's (1971b) reaction to Soar's (1966) findings:

> Soar (1966) found that instances of non-verbal affection loaded on a significant factor; curiously, however, this variable was the only teacher behavior to load on the factor---the other variables were pupil verbal and non-verbal hostility and a rating for pupil attention. Furthermore, teacher non-verbal affection did not have significant zero-order correlations with any of the achievement measures. That this factor was the strongest correlate of over-all achievement and yet was almost without other supporting teacher behaviors is a surprising and disappointing finding (Rosenshine, 1971b, p. 68).

This reaction to Soar's findings would seem to suggest that Rosenshine considers information concerning the relation of student response variables and student learning outcomes to be of less interest and importance than data on teacher variables. As indicated earlier, this orientation may well

well have definitional and historical sources. Nevertheless an exclusive focus on teacher behavior variables would seem to limit the process-product paradigm's potential for understanding and predicting teacher effects.

Contributions to teacher effectiveness formulations. In order to illustrate more fully the consequences of focusing primarily on teacher variables, it is helpful to indicate ways in which the student mediating process paradigm can be used to amplify conventional teacher effectiveness research. The following comments are intended as a brief overview of this application process.

One of the important ways in which the mediating process paradigm makes a contribution is by enriching the data base for teacher effectiveness statements. By incorporating student response variables, the paradigm enlarges the definition of research relevant to teacher effectiveness. Process-process research focusing on relations among teacher and student behaviors in the classroom, for instance, assumes significance for understanding the effects of teacher behavior on student mediating processes. These process-process studies have, with a fair amount of consistency, found that teacher classroom behavior does have an impact on overt student behavior, including the amount of student attention (see, e.g., Cogan, 1956, 1958a; Gallagher, 1970a, 1970b; Kounin, 1970; Ryans, 1961a, 1961b). On a covert level, Bloom (1953) found that various general patterns of classroom teaching have a differential effect on student thought processes during instruction (see also Siegel, Siegel, Capretta, Jones, & Berkowitz, 1963). In addition to these process-process findings, there are a number of studies on the relationship between student classroom behaviors, including attention, and student learning outcomes. Once again, results of these investigations

have with some consistency shown that student response variables are significantly related to posttest achievement scores (see, e.g., Cobb, 1972; Cobb & Hops, 1973; Morsh, 1954; Perkins, 1965; Spivak, 1973; Spivak, Swift, & Prewitt, 1971; Swift & Spivak, 1973). These results are particularly striking in Shimoni's (1973) study in which he found that students in an IPI classroom who finished units fastest spent twice as much classroom time on task than students who completed fewest units. At the same time, the slowest students spent twice as much classroom time idle than the fast students. In addition to the possibility that teacher behavior—student behavior relationships exist, intervention studies (e.g., Cobb & Hops, 1973) indicate that student classroom behaviors related to achievement can be modified with corresponding increases in student learning outcomes.

Although overt attention is a fairly gross measure of student mediating processes, the available evidence does suggest that student response variables are related to student learning outcomes and that these student response variables are influenced by teacher behaviors. There would seem, therefore, to be value in the more thorough utilization of studies involving student response mechanisms in formulating teacher effectiveness hypotheses.

In addition to expanding the data base, the mediating process paradigm would also appear to contribute to the conduct of further research in the field. The paradigm would seem to be especially useful in identifying, constructing, and/or selecting variables to submit to further investigation. Gagne (1973b) has illustrated this approach by constructing

an observation system from an analysis of variables presumed to have a direct relationship to student learning processes. The selection of teacher variables on the basis of their potential relation to student mediating processes would certainly seem to be a more fruitful strategy than the current reliance on either the shot-gun approach or box-score results from previous research.

In addition to facilitating knowledge production, the mediating process paradigm would also seem to contribute to the knowledge utilization process (on the distinction between knowledge production and knowledge utilization, see Short, 1973). This contribution can perhaps be illustrated by an example from the teacher lecturing studies (Gage et al., 1971). On the basis of findings from these studies, the teacher could plan a presentation which employed clarity, gestures and movements, and explanatory links. Given the external validity problems associated with generalizing from the sample used in the original studies, it is not unlikely that the teacher's presentation would not have the intended results, viz., high student learning outcomes. The process-product formulation, however, offers no further information to the teacher. The student mediating process paradigm, on the other hand, allows the teacher to conclude under these circumstances that the presentation failed to alert student attending responses. With the student response target defined in this manner, the teacher could then search for other potentially useful means of activating student attention.[2] Information concerning <u>effects</u> therefore become more important to the practitioner than information concerning <u>effectiveness</u>.

The use of student response variables to formulate designs for both research and for instructional interventions is precisely the way the paradigm is utilized in the fields of media and instructional programming (see Glaser & Cooley, 1973; Holland & Doran, 1973; Posner & Keele, 1973). The comments by Levie and Dickie (1973) with regard to media research and media selection provide a useful summary of this point of view:

> Early research dealing with media attributes sought main effects---- spoken versus printed words, color versus black and white, overt versus covert responding, and so forth. Invariably the emerging generalization has been that no single level of the independent variable is consistently superior and that often the variable is, in fact, inoperative. The question then turns to the more complex problem of discovering the conditions under which different levels of attributes are differentially effective. What media attributes will facilitate learning for what kinds of learners in what kinds of tasks? The shift of focus from main effects to interactions is typically accompanied by a shift of focus from the physical parameters of stimulus attributes to concern with inferences about the internal human processes that may be aroused or facilitated by media attributes. Researchers cease to be satisfied with discovering what happens but seek to explain why it happens in varying contexts.
>
> These two foci are critical to the development of a technology for media selection. The medium through which instruction is presented is but one aspect of the teaching-learning situation, and a theory of media selection would se subsumed by a theory of instruction. If improved theory is to be a goal of research, independent variables must relate to the constructs which are central to the theory----in this case, the implicit human processes which mediate instructional stimuli and learning outcomes (Levie & Dickie, 1973, p. 877).

The Culture-of-the-School Paradigm

Up to this point, the discussion has served to bring teacher effectiveness research in line with the experimental approach to instructional design and research, to establish a conceptual link between the "two separate disciplines /which/ are being developed to study meaningful human learning" (Rosenshine & Furst, 1971, p. 57). The analysis is also intended to establish

that the mediating process paradigm offers: (1) explanatory power, (2) heuristic value, and (3) potential for improving the focus and predictive power of teacher effectiveness research. In other words, this alternate paradigm appears to be a fruitful approach to the reformulation of traditional teacher effectiveness questions. There remains, however, another strategy for research on teaching, viz., naturalistic study of classroom events and processes, which would also seem to provide significant insights into the development and operation of student mediating processes. Naturalistic studies, probably for their failure to incorporate student learning outcome measures, have not always been considered directly relevant to teacher effectiveness research (see, e.g., Gage, 1966). The naturalistic approach would seem, however, to be especially appropriate in the context of the present discussion for two basic reasons. First, the naturalistic method is particularly suited to the development of hypotheses (Lutz & Ramsey, 1974) and hence meets the paradigm analysis focus of the present investigation. Second, many of the basic features of the mediating process paradigm, e.g., the use of noun-pair lists for tasks and the reliance on heavily-controlled instructional settings, are highly idealized in comparison to the circumstances presently existing in most school situations.

The naturalistic method involves observation of a target system, in this case the classroom, over extended period of time during which the observer keeps "specimen records," that is, descriptions of events and processes which appear to be either representative of the system or significant to understanding the system's functioning (see Weick, 1968).

In contrast to category system approaches (e.g., interaction analysis), the naturalistic method relies on the trained observational and interpretive skill of the investigator. In addition, the naturalistic method typically utilizes an extended time frame defined in terms of months and even years rather than behavior samples of a few hours duration. The emphasis therefore is on the "constant repetition of daily routines" (Walker, 1972) and on the importance of contextual influence on discrete instances of behavior (see Gump, 1969). These characteristics of the method have also tended to influence the kinds of variables which emerge from these studies, variables which are defined in terms closely related to the target system's operations. Exemplars of this approach in education include Smith and Geoffrey's (1968) analysis of teaching based on observations during an entire semester in one seventh-grade classroom and Jackson's (1968) study of life in elementary school classrooms from observations made over a two-year period.

It is obviously not possible here to reflect the rich array of data and insights contained in the naturalistic literature. Within the student mediating response focus, the present analysis is restricted to a single dimension of the classroom, viz., the potential effects of classroom environmental demands on student mediating responses (for a similar analysis applied to teacher behavior, see Doyle & Ponder, 1975, in press). An effort will be made, in other words, to describe, using naturalistic observation data, "the repetitive demands work makes on people and the ways in which they come to adjust, in myriad ways, to those demands" (Lortie, 1973, p. 485). The importance of analyzing student perspectives in instruction is reflected in

Bloom's recommendation for research which involves "looking at the learning situation from the viewpoint of the student rather than exclusively from the viewpoint of the teacher" (Bloom, 1963, p. 392).

The primary conceptual framework for the present analysis is derived from Sarason's (1971) study of the "culture of the school." This culture, expressed in the regularities of schooling, defines the boundaries of acceptable behavior of participants (see also Henry, 1963). A similar emphasis on the influence of environment on behavior in organizations is contained in the sociological analyses of Dreeben (1973) and of Lortie (1973). The data base for the present inquiry is derived primarily from Becker, Geer, and Hughes' (1968) study of college students and Cusick's (1973) study of high school students. Both of these studies involved participant observation of student perspectives in school environments. These written reports of other investigations have been supplemented by personal observations in junior and senior high school classrooms conducted on a regular basis over the past year and a half. Given this data base, the comments are directed primarily to the secondary level (grades 7 through 12).

Nature of the student's task. It is clear from naturalistic studies of student perspectives that the basic parameters of the student task in classrooms is defined in terms of the exchange of performance for grades. Becker, Geer, and Hughes (1968) contend that "the exchange of performance for grades is, formally and institutionally, what the class is about" (p. 79). From an even broader perspective, Schellenberg (1965) sees this exchange as the offering of performance for status. Since both of these analyses focus on higher education, the application of these generalizations to the

secondary level requires some adjustment to account for the fact that college attendance is relatively less compulsory than secondary-school attendance. This difference in educational levels would seem, however, to be relevant primarily to the students' commitment to engage in the exchange at all. Given "voluntary" attendance, more college students, on the average, would be expected to be motivated to participate in the exchange process.

It is important to note that although performance on formal examinations and assignments is of major significance, such performance is not the only basis for grades. Given that grades depend in part on the subjective appraisal of the instructor and that students and teachers meet over a relatively long period of time, in-class performance also plays a part in the exchange. This latter set of performances is defined largely by the culture of the individual classroom, a culture which indicates to students "who should talk, how much they should talk, what kinds of things they should say, how they should say them, and what the consequences are of behiving appropriately or otherwise" (Becker et al., 1968, p. 75).

One of the ways of increasing the probability that the exchange will be favorable, that performance will receive a high grade, is to discover which performances will receive a high degree of approval from the instructor. The student's basic task in the exchange becomes, therefore, that of identifying, from among the total range of possible responses, those performances for which he will be held accountable. Once these performances have been identified, the next step is obviously that of trying to acquire these capabilities. The process-product paradigm and the mediating process paradigm both seem to focus primarily on this

acquisition process. The identification process, however, would seem to be of greater significance since knowledge of performance accountability enables the student to focus his acquisition efforts. Knowledge of performance accountability, in other words, offers the distinct advantage of reducing uncertainty and saving time, a resource likely to be scarce.

Environmental demands. Although knowledge of performance accountability appears to define the basic student task, the difficulties the student encounters in actually identifying and acquiring approved performances is dependent on the kinds of environmental contengencies operating in schools. From a naturalistic perspective, it is immediately apparent that the student confronts an extremely complex and large set of environmental events (Cusick, 1973; Jackson, 1968). At the individual classroom level, there are 20 to 30 other students, one or perhaps more adults, and a range of assorted books, pictures, and other equipment. By the time he reaches the secondary school, the student experiences from four to six different classroom settings each day. Moreover, these classroom settings change entirely on a semester or an academic year basis, providing at regular intervals a new set of environments.

The available evidence suggests that there are appreciable differences among separate classroom environments and even within a single classroom setting over time (Withall, 1952). It would appear, in other words, that "every class has a culture of its own" (Becker et al., 1968, p. 75). These differences among classroom environments create different performance expectations for the student. Hence the environment creates a demand that the student engage in the identification of performance expectations on a

continuing basis.

Successful identification of performance expectations would appear to be made especially difficult by the special nature of the schooling process. In the first place, as advocates of the use of behavioral objectives point out, performance expectations in the classroom are seldom defined with a high degree of specificity. Second, the classroom is a selective rather than an adaptive educational environment (see Glaser, 1972). That is, the classroom is a mass processing system which is seldom responsive to individual performance levels and over which the individual student has little direct control (Cusick, 1973). As a result the student has a limited opportunity to stop the system in order to clarify ambiguity concerning performance expectations. Finally, the classroom is characterized by a large number of disruptions in the flow of events, disruptions coming from internal (student misbehavior) and external (public-address announcements) sources (Adams, 1972; Jackson, 1968). The classroom would seem, therefore, to offer a fairly arbitrary, discontinuous, fragmented experience, further complicating the task of identifying and meeting performance expectations.

One way of coping with the ambiguity and the uncontrolled nature of the classroom is to minimize performance requirements. Schellenberg (1965) suggests that students minimize performance requirements by attempting to establish "standards of democratic justice" which, in addition to a norm of "fairness" (e.g., moans when an assignment is made), involves efforts to standardize and simplify performance expectations (e.g., "How long is the term paper"). The significance of these standardizing and routinizing processes in controlling performance expectations may explain why Cusick

(1973) found high school students to have an obsession with procedures.

The students' ability to control and reduce performance expectations, although quite successful in certain situations, is typically constrained by the position they occupy in the social structure of the school. Eventually, therefore, the student is required to identify and conform to the performance requirements of the teacher. Given the complexity of the stimulus environment, it would seem that the student, to achieve a successful exchange of performance for grades, must develop a set of sophisticated response mechanisms which enable him to extract useful information concerning performance expectations in the classroom. It is to these mechanisms that the discussion now turns.

Student response mechanisms. In commenting on the general passivity of students in classrooms, Adams and Biddle (1970) conclude that students ultimately become "expert audience members since for much of the time most of them are watching the performance" (p. 38). A consideration of the above description of environmental demands, suggests that this expertise is defined largely in terms of the ability to recognize and attend to those cues which provide information concerning the nature of performance standards. This need to attend to cues is complicated by the fact that the classroom, from the student's perspective, is characterized by the repetition of events and by frequent and long delays. As Jackson (1968) notes, these features of classroom life place considerable demand on the student's patience. As a result students differ in their ability to attend to classroom events (Lahaderne, 1968).

Although evidence reviewed earlier suggests that attention is associated

with student learning outcomes, the student response mechanisms under consideration here involve more than merely frequency of attending responses. The ability to extract useful information concerning performance specifications is also dependent upon selectivity and timing. The number of cues which are available to the student tend to increase the probability of error. The student who is unable to distinguish between significant and insignificant cues or who fails to attend when appropriate cues occur, will have a high probability of an unfavorable performance-grade exchange. The present author has observed with some regularity students who begin the class period with rather high levels of attention but who fade gradually so that by mid-point in the session they are either idle or sleeping. It would seem that students with this reaction pattern would miss significant cues concerning performance expectations which may occur in the second part of the class period.

One way of conceptualizing the development of student response mechanisms in the classroom is in terms of research on the social psychology of experiments, in particular that directed toward subject effects (see, e.g., Adair & Schachter, 1972; Miller, 1972; Orne, 1962; Rosenthall & Rosnow, 1969; Rosnow & Aiken, 1973; Silverman & Shulman, 1970; Weber & Cook, 1972). Formulations in this area suggest that subjects, in response to the demands of the experimental setting, formulate hypohteses to explain observed events and to predict which behaviors the experimenter expects the subjects to exhibit. Although the extent to which these subject effects occur is dependent upon several factors, evaluation apprehension (the fear of not "looking good") appears to have considerable influence on the activation of these mechanisms.

The application of this formulation to the classroom situation would seem to be fairly direct. Classrooms do create some ambiguity concerning performance expectations and limited control over the nature of the events which will occur. Given that performance evaluation is a pervasive reality and indeed defines the basic student task in classrooms, evaluation apprehension would be a particularly strong effect. It is clear from the artifact research that the magnitude of subject effects is dependent on the subject's ability to recognize cues and his motivation to please the experimenter. These same competence and motivation variables would also seem to operate in the classroom in determining whether the student will engage in the performance-grade exchange and, if so, whether he will be successful.

Another conceptual framework useful in understanding the development and operation of student response mechanisms is contained in Voss' (1969) analysis of noncontent outcomes in learning. Voss argues that, "in a given task situation, the components of the task evoke task responses (T_r), with the entire set of responses related to a particular task situation called a task system (T_s)" (p. 163). He further hypothesizes that these task response systems develop in a manner analogous to that of a motor skill. It would seem that, in response to the task components in the classroom, students also develop a task response system appropriate to the unique demands of that environment.

Summary. The above analysis suggests that the particular demands of classroom life require that the student who cares to exchange performance for grades acquire a set of response mechanisms which enable him to

recognize and attend to environmental cues which define performance expectations and which facilitate the acquisition of these capabilities. The length of time a student spends in school and the multiplicity of distinct classroom environments he encounters suggest that the student receives considerable opportunity to practice these response mechanisms.

Implications for Teacher Effectiveness Research

The student response mechanisms emerging from the analysis of the culture of the school would seem to have a number of significant implications for traditional teacher effectiveness research. The remaining comments are designed to delineate some of these potential contributions, with special reference to the process-product and the student mediating process paradigms described earlier.

Explanatory contributions. The preceding analysis of student response mechanisms adds even greater weight to the argument for incorporating student process variables into teacher effectiveness formulations. The teacher may well be the most overtly active agent in the classroom, but student achievement (broadly conceived) would appear to be dependent in large measure on the student's ability to learn from school-like events. Assumptions concerning student passivity and the direct causal influence of teacher behavior simply fail to capture central processes operating in classroom learning. These student response mechanisms developed in reaction to environmental demands in the classroom would also seem to enlarge the scope of the student mediating processes paradigm. The mediating process paradigm tends to emphasize information processing operations relevant to the acquisition of performance capabilities but neglects the identification

mechanisms made necessary by the particular nature of existing classroom environments.

The consideration of student response mechanisms, in addition to enlarging the scope of existing paradigms, would also contribute to an explanation of available teacher effectiveness findings. Qualities such as teacher clarity and task orientation would seem to reduce the complexity of identifying performance specifications and variability and enthusiasm would make attention earier by providing a changing stimulus display (see Rosenshine & Furst, 1971, concerning these variables). To the extent that these teacher variables have these functions, they would increase the number of students who are able to find the teacher's performance demands and hence would increase class mean achievement scores. From the viewpoint of student response mechanisms, however, an even more powerful explanatory model is available. Teacher variables such as clarity, task orientation, and enthusiasm tell the student that the teacher is serious about the subject matter and hence will hold the students accountable for knowing this content. As indicated earlier, this knowledge of accountability is crucial to allowing the student to concentrate acquisition efforts. On the other hand, an unorganized and dull presentation suggests to the students that the teacher is not really that serious about this content and therefore will either not expect accountability or, if so, will not impose stringent standards to judge student performance. These teacher variables, in other words, provide information to the student concerning the degree of accountability he can expect concerning the particular content the teacher is presenting.

Although an increase in explanatory power is an important contribution, the analysis of student response mechanisms would seem to be especially useful in extending the scope of teacher effectiveness formulations. Of particular importance here is the fact that student response mechanisms emerge as a reaction to the demands of the total school environment rather than only in relation to teacher behavior variables. This point supports the value of analyzing the relative utility of the several classes of cues available to the student in a given school setting.

Cue utilization. The student's success in identifying cues is facilitated by the large amount of redundancy existing in the school environment. As noted earlier, however, the student must also learn to attend to appropriate cues. Although teacher variables such as clarity, variability, and enthusiasm (and other behavior variables defined by systematic observation instruments) appear to make a contribution, they are obviously not the only cue resources available to the student for identifying performance specifications and for acquiring performance capabilities. Wallen and Travers (1963) observe, for instance, that one of the most lawful teacher practices is the regular delegation of stimulus control to other instructional resources, such as textbooks, workbooks, films, etc. In addition, feedback from the teacher concerning performance on tests and other assignments would seem to play a vital role in defining and clarifying performance expectations. Becker et al. (1968) summarize the process as follows:

> In short, when a student first enters a class he does not know what will be required of him and on what basis his performance will be judged, even though the instructor may have attempted to give an

> explicit account of these matters. The ambiguity, however, decreases as the course continues. As the instructor grades early assignments and tests, he communicates more precisely the criteria he is using, either explicitly or by the reasoning he uses to justify his decisions (p. 70).

Along these same lines Bloom (1963) reviews evidence which suggests that "the type of mental process the student expects to be tested will determine his method of study and preparation" (p. 392). Tests then would seem to play a central role in the identification of performance standards and in activating mediating responses which enable the student to acquire the necessary proficiency.

In addition to the cueing effects of these classroom-related events, Walker and Schaffarzick (1974), in a recent review of curriculum effects studies, present a compelling argument for the significance of "inclusion" and "emphasis" as factors determining student learning outcomes. In summarizing and evaluating available curriculum research, they observe that in those studies in which the posttest content favored the experimental curriculum, students in the experimental groups scored higher than those in the traditional curriculum groups. A similar trend was present for students in the traditional groups when test content favored the traditional curriculum. It would seem therefore that different curricula engender different patterns of achievement (see also Mayer & Greeno, 1972). They conclude therefore that:

> differences in mode or medium of presentation do not as a rule have as great an effect on subject matter achievement as content inclusion and emphasis. Curricula-in-use are multifaceted and redundant. Students, by the time they reach school, exhibit a considerable variety of active learning capacities which enable them to interpret and comprehend their world. Once an item of content has been included in the textbooks and identified as something children should learn, the multiple

> resources of the curriculum-in-use and the variety of student learning processes combine to produce a level of achievement that is usually greater than any additional increment that might be produced by any further refinement of the curriculum or any improvement in teaching style or method, medium of instruction, or organizational change in the school or classroom (Walker & Schaffarzick, 1974, pp. 100-101).

The teacher as cue resource. Generalizations concerning the function of other cues in the instructional environment call special attention to the question of the comparative magnitude of teacher effects. Heath and Neilson (1974) review evidence which suggests that "given the well-documented, strong association between student achievement and variables such as socio-economic status and ethnic status, the effects of techniques of teaching on achievement (as these variables are defined in the PBTE research) are likely to be inherently trivial" (p. 481). In a study more directly related to process variables, Anderson & Kaplan (1974) estimate that approximately 9.8% of the variance in individual student achievement is attributable to teacher clarity (as conceptualized by Rosenshine & Furst, 1971) and, in their own data, found that only 3% of the variance in math achievement was associated with the teacher behavior variables they measured. Similar results are summarized by Walberg (1971) concerning the low percentages (0 to 17) of variance associated with instruction variables in contrast to the rather large amounts associated with student variables and measures of environment. Walberg also suggests that the variance estimates concerning instructional effects are biased upward.

In the terminology of the present analysis, there would appear to be evidence that teachers are not always reliable resources for ascertaining performance specifications and acquiring performance capability. Zahorik (1968) found that teacher feedback during class discussion was not very

informative and that teacher feedback practices appeared to depend upon a number of factors other than the quality of student responses. Similarly, Bellack, Kliebard, Hyman and Smith (1966) found that the positive reactions of teachers to student responses in the classroom did not always depend on the accuracy of the response. In other words, there was a high probability that a student response would be praised regardless of whether it was correct or not. These results may explain why variations in the amount of teacher praise do not appear to influence student learning outcomes (Rosenshine & Furst, 1971).

To the extent that teacher classroom behaviors are unreliable as cues concerning performance expectations, the student interested in exchanging performance for grades is required to compensate for teacher variables by attending to other cue resources. Indeed, one of the major functions of student response mechanisms would seem to be that of compensating for the irregularities occurring in instructional environments. Evidence for this ability to compensate is contained in Gagne's (1973a) finding that differences in the sequence of an instructional presentation have little differential effects on the retention of verbal information.

One of the major effects of this compensatory ability of students would seem to be a reduction in the significance of variations in instructional conditions unless these variations are directly related to the definition of performance specifications. This reduction in the significance of variability would seem to be especially true with regard to the kinds of teacher behaviors typically used as targets for teacher effectiveness research. There is little reason to believe that these teacher behaviors

are part of the core of cue resources concerning either the identification or the acquisition of approved performances. Furthermore, the student's motivation to engage in the performance-grades exchange at all depends on the extent to which he values the kinds of rewards which this exchange can offer. The development of such attitudes toward the exchange process would seem to occur over a long period of time and hence would not be susceptible, except in rare cases, to modification by means of minor variations in teacher behavior.

Summary and interpretations. The above analysis strongly suggests that the student has at his disposal, if he cares to use them, a set of alternate guidance systems which are fostered by the unique demands of school learning and which serve to compensate for the unreliability of environmental cues concerning performance specifications and the acquisition of proficiency. These guidance systems are not totally dependent on any one set of instructional conditions for activation and, indeed, appear to function to reduce the significance of variations in these environmental cues. From the student's perspective, the most important parameter is that which defines performance expectations. Once this knowledge of accountability is acquired, the student can utilize other cue resources to monitor instructional conditions and to activate mediating responses which result in the acquisition of performance capabilities. Moreover, many of the strongest cues (e.g., tests) are not those which are typically measured by single-class observation techniques.

This analysis of student response mechanisms suggests that variations in teacher behavior and especially those behaviors typically associated with

teacher effectiveness research do not have a major impact on student learning outcomes. This is not to say that these teacher behaviors have no impact at all in the classroom. Teacher clarity, enthusiasm, and warmth would appear to be especially relevant to localized student attitudes toward a particular teacher or course and to influence satisfaction variables, which are not necessarily related to student achievement (see, e.g., Anderson & Kaplan, 1974). These localized attitudes toward the teacher would not, however, be necessarily equivalent to the student's basic attitude toward the value of engaging in the performance-grades exchange, although they may make it easier. It is also necessary to note that the effects of teacher classroom behaviors may be greater at the elementary than at the secondary level (see Ryans, 1961b). The major point here is, rather, that such teacher behavior variables do not necessarily play a central role in defining performance standards or in acquiring performance capabilities. Hence there is little reason to expect that variations in these teacher behaviors should be strongly related to mean gains in student achievement as conventionally measured in this research tradition.

One implication of this perspective concerns the value of laboratory research on teacher behaviors. Under experimental conditions, it is possible to restrict student access to the kinds of resources which typically exist in classrooms (e.g., textbooks and teacher feedback from tests). The removal of these resources would increase student dependence upon the teacher as a cue resource. The final effect should be to inflate the effects of teacher behavior on student learning outcomes. Such findings

would not, however, be generalizable to the classroom setting in which other, more powerful, environmental cues are readily available.[3]

Conclusion

The preceding discussion of paradigms in teacher effectiveness research is designed to demonstrate that such an analysis is a legitimate and useful approach to the improvement of research in this domain. Any conclusions are necessarily speculative and depend upon empirical study for validity. The analysis of student response mechanisms would seem, however, to have a sufficient number of nontrivial implications to merit further attention.

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Footnotes

[1]Rosenshine (1971a, p. 13) contends that his review of process-product studies is not directed to the question of teacher effectiveness. He bases this position on the limited range of school outcomes represented by student learning outcome measures and therefore argues that he has not exhausted all important teacher effects. It would seem, however, that focus on a rather narrow range of outcomes is typical of the teacher effectiveness field, regardless of periodic claims to the contrary. Moreover, Rosenshine's work is cited frequently by teacher educators and evaluators with the intent of applying his conclusions to those areas traditionally associated with teacher effectiveness research. Hence it would seem legitimate to view the process-product framework as a teacher effectiveness paradigm.

[2]This particular approach to knowledge utilization would also seem to be reflected in the behavior-modification approach to classroom processes. (see, e.g., Resnick, 1971). Behavior modification designs are not limited to a list of "effective" reinforcers, but rather emphasize the use of a framework for the analysis of individual situations. This framework specifies for the practitioner the kinds of information to gather and how to interpret relationships among behavioral events. This approach would seem to have more utility in teacher decision-making than a list of process-product associations.

[3]The present analysis has some features in common with those of Stephens (1967) and Olson (1972), both of which are attempts to explain the similarity of effects among different instructional modes. Stephens

argues that spontaneous tendencies, emerging as part of the evolution of man, bring schools into existence and activate mechanisms in teachers and students which, regardless of stylistic differences, are sufficient for learning to take place. In contrast, the present analysis emphasizes the function of student response mechanisms in reducing the significance of variability in teaching modes and the development of these mechanisms as a response to the unique demands of the school environment, rather than through human evolution. Olson's interpretation, which is closer to the present analysis, emphasizes the importance of basic information exchange processes in instruction. Different instructional modes have common effects in that they convey the same amount of information to the student, even though they differ in the information demands they impose. The present analysis also focuses on information exchange, but stresses the student's ability to select information relevant to his perception of performance standards in a particular instructional setting. From this perspective, settings which contain different performance expectations should produce different outcomes, whereas different instructional conditions directed to the same performance expectations should have equivalent effectiveness.